IN THE SPECIFICATION

After “greatly limited.” on page 3, line 6; please add the following new paragraphs:

The U.S. patent application US 2002/0021068 discloses a device for generating electromagnetic radiation. The walling of the tube serves at the same time as cathode, and is transparent for the X-ray radiation. In an embodiment variant, the cathode possesses a thin electron-emitting layer. The X-rays emerging from the target pass through the cathode, and are radiated to the outside.

The U.S. patent application US 2001/0019601 describes a cold cathode, which consists of nano tubes.

In the miniaturized X-ray tube described in the patent document U.S. 5,729,583 the anode of the X-ray tube is designed at the same time as walling of the X-ray tube head. The X-ray radiation is emitted directly to the outside.

The cathode in the X-ray tube disclosed in the U.S. American patent application U.S. 2003/0002627 is a carbon nano tube, or possesses a layer of a similar substance.

The American patent U.S. 6,477,233 discloses a miniaturized X-ray tube in which the two electrodes are disposed opposite each other inside a cavity formed by the walling.

The German patent document DE 198 32 032 discloses an X-ray tube with a thermal cathode, which is nevertheless suitable for use in catheters for treatment of blood vessels. In this X-ray tube, the cathode is designed as a solid cylinder.

Thanks to its very minimal size, a miniaturized X-ray tube such as in the international patent application WO 99/62589 can be used to treat tissue

inside the human body. One of the embodiment variants discloses an X-ray tube in which the anode is designed as hollow cylinder.

The French patent application FR 2 574 592 describes a back scatter X-ray tube by means of which X-ray radiation of very high power and very short duration can be generated. For this purpose the described X-ray tube possesses a focusing mechanism for the electrons accelerated to the target.

The patent applications US 2003/0063707, US 2004/0008818 as well as the patent document U.S. 4,670,894 disclose X-ray tubes having at least partially a cylindrical shape.

Please amend the paragraph at the bottom of page 3 as follows:

In particular, these object are achieved according to the invention in that in the X-ray tube an anode and a cathode are disposed opposite each other in a vacuumized internal chamber, electrons being able to be accelerated to the anode by means of impressible high voltage, the cathode comprising a thin layer or coating of an electron-emitting material, and the cathode comprising a substrate substantially transparent for X-ray radiation, the X-ray tube being designed as an anode hollow cylinder with a coaxial cathode hollow cylinder inside. This embodiment variant has the advantage, among others, that e.g. the material to be irradiated can be put inside the cathode hollow cylinder. This ensures an evenly high and homogeneous irradiation of the object from all sides (4π), which would hardly be possible otherwise. This embodiment variant can be suitable in particular for sterilization with continuous conveyance of the material to be sterilized, and thus for high throughput. ~~The cathode can thereby close the vacuumized internal chamber toward the outside, for example. For conversion of the electrons⁻ into X-ray radiation, the anode can comprise in particular e.g. gold and/or molybdenum and/or tungsten and/or a compound of the metals. An advantage of the invention is, among others, that the cooling of the anode can be optimized since the anode does not have to be selected to be transparent for X-ray radiation, compared with a design alternative with an anode transparent for X rays.~~

At the bottom of page 3, please add the following paragraph:

In another embodiment variant, the cathode can thereby close the vacuumized internal chamber toward the outside, for example. For conversion of the electrons$^-$ into X-ray radiation, the anode can comprise in particular e.g. gold and/or molybdenum and/or tungsten and/or a compound of the metals. An advantage of the invention is, among others, that the cooling of the anode can be optimized since the anode does not have to be selected to be transparent for X-ray radiation, compared with a design alternative with an anode transparent for X rays.

Please amend the paragraph at the top of page 4 as follows:

In an embodiment variant, the cathode comprises a thermionic emitter. This embodiment variant has the advantage, among others, that thermionic emitters are state of the art in X-ray tubes, and distinguish themselves through high stability and long service life. The emitters can thereby ~~consist of~~ be made from heated tungsten wires which are either strung parallel or are welded to a mesh grid. Emitters of barium hexaboride or so-called heated dispenser cathodes based on barium mixed oxides can also be used, however, which have a very high emission current density, and can be arranged in groups in order to achieve large-area cathodes.

Please delete the following paragraph at the bottom of page 4:

~~In an embodiment variant, the X-ray tube is designed as an anode hollow cylinder with a coaxial cathode hollow cylinder inside. This embodiment variant has the advantage, among others, that e.g. the material to be irradiated can be put inside the cathode hollow cylinder. This ensures an evenly high and homogenous irradiation of the object from all sides (4π), which would hardly be possible otherwise. This embodiment variant can be suitable in particular for sterilization with continuous conveyance of the material to be sterilized, and thus for high throughput.~~

Please delete the following paragraph at the top of page 5:

~~In another embodiment variant, the anode is designed as a round or angular surface, the anode being irradiated by a cathode of laminar or reticulate design, substantially transparent for X-ray radiation (γ). This embodiment variant has the advantage, among others, that also large-surface material to be irradiated can be brought very close to the X-ray source. Since the anode does not need to be irradiated through, and a high cooling capacity on the anode can thereby be achieved, the current density of the emitter at the site of the material to be irradiated can be increased many times over, compared with an embodiment with transparent anode. Furthermore it is also possible with this embodiment variant to irradiate the material to be irradiated from a multiplicity of sides, in particular from 2 sides, at the same time, using a multiplicity of emitters, and thereby further reduce the required irradiation time. A multiplicity of such embodiment variants can be also be put together in modules in order to irradiate larger objects.~~

Please amend the following paragraph of the specification beginning on page 7, line 1 to read as follows:

________According to the invention, the vacuumized internal chamber 41/42 of the X-ray tube 11/12 can be closed off by the transmission cathode ~~31/32~~ 21/22 ~~toward~~ from the outside, at an outer perimeter or respectively ~~toward the inside at~~ at an inner perimeter, for example. The radiation goes through the transmission cathode 21/22, and behind it hits the material to be irradiated. The anode 31/32 comprises a layer of a metal with a high atomic number, e.g. gold and/or molybdenum and/or tungsten and/or a compound of the metals, allowing an efficient conversion into X-ray radiation γ. The anode 31/32 further comprises a cooling for cooling the thermal energy being created. The anode 31/32 must be cooled since typically only about 1 % of the electric capacity is converted into X-ray radiation, and the rest must be given off as heat. The cooling can take place using water or with forced air. Through the configuration according to the invention, the entire radiation can be made use of in the outer half space. In contrast, in the conventional configuration, only about 10 % of the radiation can

be used in the half space (with 50° angle of opening of the window). A second advantage is that the area irradiated by the electrons e^- is considerably larger in the design according to the invention than in the conventional configuration. Assuming an irradiated area (anode) of 20 x 20 cm^2 and a possible cooling capacity in this area of 200 W/cm^2, there results a possible total electrical power of 80 kW, in contrast to 6 kW with the conventional tube. That is a further increase by a factor of 10. A transmission cathode 21/22 possibly absorbs, however, more radiation than ~~a Be~~ the window in a conventional tube, depending upon the design. The output radiation [[~~is~~]] can ~~<sic.> be~~ thereby be reduced by about half, depending upon wavelength. A dose rate increased overall by a factor of 50 still nevertheless results from this on a area of about 20 x 20 cm^2, compared with the configuration with a conventional X-ray emitter. This increase in dosing capacity makes it possible, for example, to carry out sterilization with X rays in very short time periods.

Please amend at page 8 line 21 by deleting "31" and inserting therefor "21".

Please amend the following paragraph of the specification beginning on page 8, line 30 as follows:

Figure 3 shows schematically an architecture of ~~another embodiment example~~ a section of an X-ray tube 12 according to the invention. Electrons e^- are thereby emitted from thermionic or cold emitters 72 in a transmission cathode 22, and X rays γ are radiated from an anode 32, the ~~cathode 32~~ cathode 22 closing the vacuumized internal chamber 42 ~~toward~~ from the outside. The ~~cathode 32~~ cathode 22 is designed as a round or angular surface, the anode 32 being irradiated by the emitters 72 of laminar, reticular or linear design, for example. Like reference numeral 50, reference numeral 52 designates e.g. a metallic cylindrical housing 52, which comprises the vacuumized internal chamber 42, and reference numeral 62 designates an insulator, which separates the potential of the cathode and of the anode. It is also conceivable, however, for

the housing 52 to be produced out of an insulating material, and for the insulator 62 to then be omitted. It is to be pointed out that the embodiment variants described by means of Figures 2 and 3 are especially intended for use of cold emitters, through the use of large-surface electron emitter configurations. Configurations with thermal cathodes are of course also conceivable, however.